PLANT PROTECTION BULLETIN

A Publication of the
WORLD REPORTING SERVICE ON PLANT DISEASES AND PESTS

VOL. III, No. 2 NOVEMBER, 1954

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME, ITALY

COMMONWEALTH MYCOLOGICAL INSTITUTE
12 FEB 1955

FAO PLANT PROTECTION BULLETIN

is issued as a medium for the dissemination of information received by the World Reporting Service on Plant Diseases and Pests, established in accordance with the provisions of the International Plant Protection Convention, 1951. It publishes reports on the occurrence, outbreak and control of pests and diseases of plants and plant products of economic significance and related topics, with special reference to current information. No responsibility is assumed by FAO for opinions and viewpoints expressed in the Bulletin.

Manuscripts for publication, or correspondence regarding the World Reporting Service, should be addressed to Dr. Lee Ling, Plant Production Branch, Agriculture Division, FAO, Viale delle Terme di Caracalla, Rome, Italy; subscriptions and other business correspondence to Documents Sales Service, FAO, Viale delle Terme di Caracalla, Rome, Italy.

The Bulletin is issued monthly in English, French, and Spanish, twelve numbers constituting a volume. Subscription rates are $ 3.00 or 15s. per annum; single numbers are priced at $ 0.30 or 1s. 6d. The citation is FAO Plant Protection Bulletin, or, in abbreviation, FAO Plant Prot. Bull.

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FAO Plant Protection Bulletin

Vol. III, No. 2 A Publication of the November 1954

World Reporting Service on Plant Diseases and Pests

A Deformity of Tomato Fruit Due to Virus Infection in Italy

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In the coastal area, between Pesaro and San Benedetto del Tronto, of the Marches region in central Italy, tomato fruits have been found for some years damaged by a disease which had not been recorded previously. The deformity of the fruit due to disease infection causes a total or partial loss of its marketing value and is of special importance in the varieties with round, smooth fruit grown for export purposes. In such varieties, particularly the variety Comet, about 10 to 15 percent of the fruits are generally damaged and in some cases the proportion of the deformed fruits may reach as high as over 50 percent. Losses to the growers in the Marches region are therefore highly significant.

According to the officials of the Institute of Foreign Commerce (I.C.E.), who first brought our attention to the occurrence of this disease, a similar disorder also appears to be widespread in Sicily, especially in the southeastern province of Siracusa, where the resultant losses are even higher than those in the Marches region.

Symptoms and Development

The incipient external symptoms of this new disease appear at the stage when the fruit is nearly fully developed, usually about twenty days before ripening. At first the affected fruit shows irregular bleached translucent spots with indefinite borders, mostly on the half of the fruit near the stem end. Later, when the fruit becomes ripe, the spots turn to brownish–gray with yellowish edges and become slightly depressed and rough (Figure 1).

Within the fruit, this disease is characterized by the presence of brown discoloration of tissues. By touching the surface of the fruit, the affected areas can be differentiated from the normal areas by the more tough and firm texture.

A conspicuous and constant characteristic of this disease is that only the fruits formed during the early season show this deformity. The affected plant evidently is capable of recovering from the disease as the season progresses, and the clusters produced later in the season always contain sound fruits only.

In an affected plant, often not all fruits on a cluster are diseased. It is also interesting to note that no consistent symptom on the foliage has been observed in association with this disease.

Causal Agent

The symptoms of the disease briefly described above are very similar to those of the internal-browning disease found in tomatoes in New Jersey by Haenseler[1].

Holmes[2] presented evidence that the internal browning is caused by strains of tobac-

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[1] Haenseler, C. M. "Internal browning of tomatoes in New Jersey," *Plant Dis. Reptr.* 33 : 336–337. 1949.

[2] Holmes, F. O. "Internal-browning disease of tomato caused by strains of tobacco-mosaic virus from Plantago," *Phytopath.* 40 : 487–492. 1950.

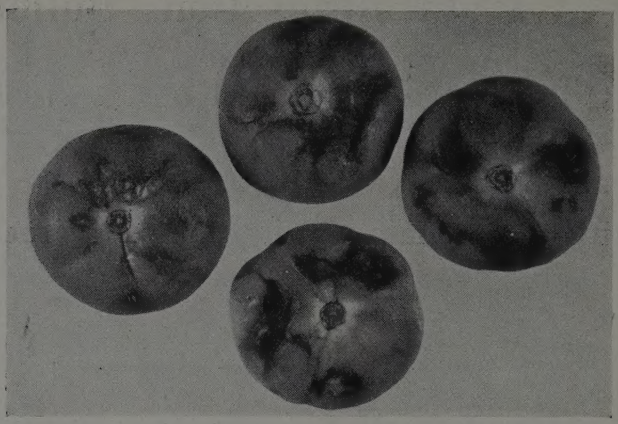

Figure 1. *Deformity of tomato fruits, naturally infected by a virus.*

co-mosaic virus (*Marmor tabaci* var. *plantaginis* Holmes) derived from species of plantains (*Plantago* spp.). He, however, emphasizes that similar diseases found elsewhere are not necessarily of the same nature.

The disease found in the Marches region is also caused by a virus and has been reproduced experimentally. By mechanical inoculation with juice extracted from diseased fruits, tomato plants free from any virus infection have been infected and have produced fruits with characteristic symptoms (Figure 2). From the results of experiments which are still under way, the causal virus seems to be

Figure 2. *Deformity of tomato fruits, reproduced by mechanical inoculation.*

a strain of the tobacco-mosaic virus closely related to the one from *Plantago* described by Holmes. However, reports on the internal-browning disease in New Jersey and similar diseases found elsewhere in the United States indicated that all efforts to reproduce such diseases by mechanical inoculation have failed. In view of the fact that the causal virus of the disease dealt with in this note could be transmitted readily by mechanical means, further experiments to determine its identity and relationship will be carried out.

Nematodes and Root Diseases of Cotton in Peru

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In recent years, especially on the coast of the central part of Peru, the root knot nematode, identified as *Meloidogyne incognita* var. *acrita* Chitwood by A. L. Taylor of the United States Department of Agriculture, has been assuming alarming importance. The presence and spread of this nematode have complicated the problem of cotton root diseases which have been the major concern of cotton growers for many years.

Wilt caused by *Verticillium albo-atrum* and root rot caused by *Thielaviopsis basicola* are the principal fungous diseases affecting established cotton plants. Although those two diseases are destructive and often cause serious damage, regrowth usually takes place in a regular percentage of affected plants, especially those of resistant varieties. In the past two years, however, it has been observed that a much greater percentage of ratooned cotton plants, especially those of varieties susceptible to the wilt and root rot, failed to produce new growth after disease infection. Where high percentages of plants were killed, it frequently became necessary to destroy those plants and to replace them with other crops because there was not time to replant cotton.

At the Casablanca Farm, Valley of Lurin, a ratoon field was found to suffer a loss of 60 percent of cotton plants due to root diseases. A detailed study was made of 200 plants, including those with and without new growth, in order to determine the organisms associated with the failure. In the roots of each plant, isolation was made at three different points. The results obtained are summarized in Table 1.

The results indicate that infection by the root knot nematode alone is generally not sufficiently destructive to kill the plants, as all the 46 plants observed with nematode infection recovered from attack. The affected plants usually produce vigorous new growth. When, however, the plants are attacked by the nematode in combination with *Thielaviopsis basicola* or *Verticillium albo–atrum* or both, they mostly fail to resprout or produce only feeble shoots which soon die. The combined attack of the nematode and *V. albo–atrum* is especially destructive, resulting in the death of a high percentage of plants.

The above conclusion cannot, however, be considered general. Very recently, many cotton plants in a ratoon field at the Chincha

Table 1. – *Organisms associated with recovered and dead cotton plants infected by root diseases*

Condition of plants	Total number of plants examined	Number and percentage plants infected with			
		Nematode	Nematode + *Thielaviopsis*	Nematode + *Verticillium*	Nematode + *Thielaviopsis* + *Verticillium*
Recovered	80	46 (57%)	14 (18%)	8 (10%)	12 (15%)
Dead.	120	0	6 (5%)	48 (40%)	66 (55%)

Valley (Lurinchincha) were reported to be killed by root diseases. Examination of the samples of roots of the dead plants revealed that the attack was due only to the root knot nematode and no trace of *Verticillium* wilt or root rot was found.

The root knot nematode enters the tip of young roots causing lesions in roots and rootlets, which later crack or decay, thus providing for the entry of other soil–borne pathogens. Varieties normally resistant to wilt and root rot become susceptible through the initial attack of the nematode. The nematode–fungus disease complex is, therefore, more destructive than either infection alone. On the other hand, the root knot nematode itself is evidently also capable of killing the plants through its virulent action inside the roots and also probably through its effect on the uptake of nutrients by the host.

In view of the importance of the nematode problem, the plant breeders at the Agricultural Experimental Station at Cañete initiated two years ago the selection of Tanguis cotton strains resistant to the root knot nematode as well as to the root diseases of fungous origin.

Recent Developments in Plant Diseases in India

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Survey of Physiologic Races of Wheat Rusts

THE analysis of wheat rust samples, collected from different parts of India, for the determination of physiologic races is extremely important. It gives a comparative picture of any changes in frequency and distribution of races and also helps to identify new physiologic races which might otherwise remain undetected. When a race is suspected to be new, a single spore culture is established and its reactions are investigated at different temperatures before a number is assigned to it. The race is then perpetuated at the altitude of 7,000 feet above sea level at the Rust Research Sub–station, Simla, where, due to congenial climatic conditions, it is possible to maintain cultures throughout the year. All the races so far isolated are now being maintained, so that the inoculum of any race can readily be made available to plant breeders and pathologists in different states for field and glasshouse tests.

Annual surveys on the physiologic races are carried out regularly in order to provide information to plant breeders regarding the occurrence of physiologic races in a particular region, thus enabling them to draw up their breeding programs. The work of maintenance and determination of races is centered on an all–India basis at the Rust Research Sub–station, Simla, which serves therefore as the focus of wheat rust research in the country.

During the recent study of physiologic races it was observed that one sample of stem rust (*Puccinia graminis tritici*) collected from the wheat variety Kenphad–28 in Coimbatore caused resistant reaction in some standard differential hosts, such as Little Club, Marquis, Arnautka, Mindum, Spelmar, etc., which are susceptible to all races hitherto reported in India. This indication of the presence of a new race was later confirmed by a detailed study of the single spore cultures. This new race is closely allied to race 72 and has been designated provisionally as race C.

Indications of a new race of leaf rust (*Puccinia triticina*) have also been obtained in recent months. One sample collected from Pusa in Bihar State is capable of producing infection of type 4 on the differential variety Mediterranean which has, so far, been resistant to all the known races of this rust in India. It may therefore prove to be a potential danger and confirmatory tests are in progress.

The appearance of new races, by mutation, involving changes in pathogenicity is rare and so far has not been observed in India, even though some of the single spore cultures have been maintained at Simla since 1931 and have completed more than 300 generations. A colour mutation, however, has been reported recently. The mutant shows significant differences in colour and size of the spores and also in its incubation period.

A New Race of Flax Rust

Flax rust caused by *Melampsora lini* is another important rust, the physiologic specialization of which has received intensive study. Four races occurring in India, designated as I_1, I_2, I_3, and I_4, have already been reported. Recently a new race, capable of infecting the differential varieties Argentina (C. I. 705–1) and Koto, has been identified. On the former variety, which is either immune or highly resistant to all recorded races, it produces susceptible–type infection. Similarly the differential host Koto, a variety immune to all the four Indian physiologic races, can be slightly infected by this race, producing small pustules of resistant type. This race has now been designated as race I_5.

An Unrecorded Disease of Guava

A serious disease of guava (*Psidium guajava*) of widespread occurrence in the Pushkar Valley of Ajmer Merwara first received serious attention in 1949. The disease causes stunting of shoots, extreme reduction of leaf size and defoliation (Figure 1). The leaves of affected plants become leathery and occasionally show interveinal yellowing and green veinbanding. Few or no flowers develop on diseased shoots and any fruits borne on these shoots are cracked and dry up. The characteristic symptoms indicated that the disease could be of virus origin although the possibility of it being a deficiency disease was not ruled out even in earlier studies. The disease appeared in severe form and in certain orchards it was observed to cause heavy losses. In fact, growers in the Pushkar area reported that they were abandoning guava cultivation due to the destructive nature of the disease.

All attempts to transmit the disease during the period from 1949 to 1953 were unsuccessful. Recent experiments in the Pushkar area with zinc sulphate sprays have, however, given encouraging results. Young diseased plants about two to three years old which had been sprayed in one orchard have put out normal healthy leaves. In older plants the new growth after spraying appears normal and healthy and the plants are now flowering and fruits are setting.

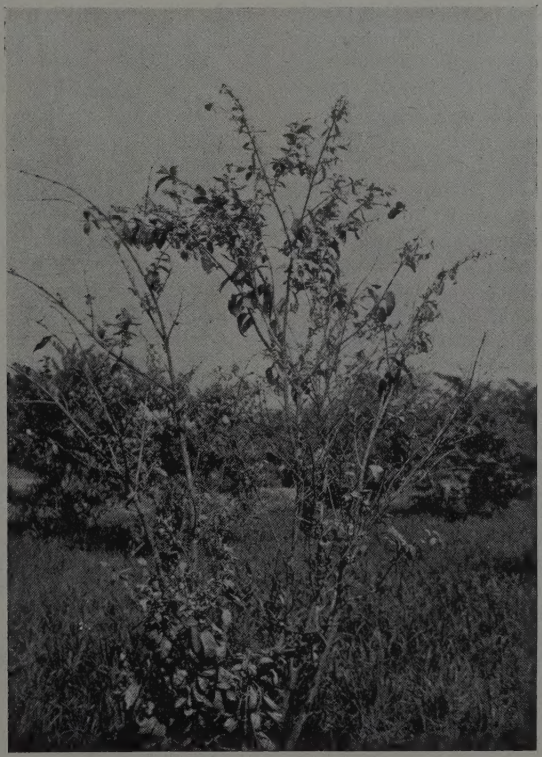

Figure 1. A diseased guava tree showing defoliation.

Plant Disease Situation in the United States[1]

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A New Phytophthora Blight of English Holly

COMMERCIAL production of English holly (*Ilex aquifolium*) in Oregon has increased in recent years and the more than 1,000 acres in orchards now make holly one of Oregon's important speciality crops. The Pacific Northwest is the principal source of cut English holly sold throughout the United States for Christmas greenery and of holly nursery stock sold for landscape plantings.

A previously undescribed disease, caused by a species of *Phytophthora*, has been shown to be the major disease of holly in Oregon. Previously, *Boydia insculpta* (Oud.) Grove and *Phomopsis crustosa* Bomm. & Rouss. were reported as pathogenic to holly. Symptoms described as caused by these fungi were similar to part of the symptom complex now known to be induced by the *Phytophthora*. Although the pathogenicity of the *Phytophthora* has just been recognized, the disease is not really new, for growers report having seen similar symptoms for many years and oospores of the fungus have been found in diseased herbarium specimens collected as long as 20 years ago and filed under other names. The disease is also known in Washington State and may be present throughout the English-holly-growing region in the United States and Canada.

Symptoms consist of black leaf-spotting and subsequent defoliation, and development of twig cankers. Leaf-spotting begins in the lower part of the trees in late fall and progresses upward during the winter. Twig dieback and canker development on larger stems are evident later in the winter. Infection in the spring may take place at a berry cluster some distance from the tip of a twig, and the organism may girdle and kill the twig. In this case the leaves turn brown and remain on the twig, producing a flagging effect. Large limb and trunk cankers are associated with the other symptoms but the casual organism has not been isolated from such cankers. Young plants in nursery beds are also affected and may be defoliated and killed by the pathogen.

The disease develops during cool, rainy weather and subsides during the warm, dry summer months. The disease may reach epiphytotic proportions in dense orchards where wind movement is restricted. It is especially severe in some orchards in the coastal regions of Oregon, where up to 80 percent of the twigs may become completely defoliated, with serious twig blighting, particularly on lower limbs.

After the initial leaf-spotting occurs in the fall, sporangia are produced on sporangiophores that emerge from the stomata on the lower leaf surface. Leaf infection may take place through leaf-spine punctures and possibly through stomata on uninjured leaves. Twig infection occurs through leaf scars, and the pathogen may progress from the twigs into larger stems and cause cankers. Oospores are formed in leaf spots and in the cortex of diseased twigs. It is postulated that the oospores are the means of over-summering.

The *Phytophthora* was readily isolated from newly-diseased tissue during the summer months. *Boydia*, *Phomopsis* and many other organisms were recovered from the diseased tissue. All inoculations with the *Phytophthora* resulted in symptoms identical with naturally-occurring symptoms. All inoculations with *Boydia*, *Phomopsis*, *Nectria galligena* Bres., and other fungi and bacteria obtained by isolation were negative.

[1] This report is based upon material submitted by Collaborators of the Plant Disease Epidemics and Identification Section, Agricultural Research Service, United States Department of Agriculture.

The *Phytophthora* belongs in the *Syringae* group but is distinct from all previously described species.

Field control trials have not yet been carried out. Since protection is needed during the rainy winter months when holly is cut and sold, any protectant used should leave no visible residue. The failure of the disease to become destructive in young or less dense orchards indicates that prevention may be achieved by selection of moderately open and well-drained planting sites, proper spacing and pruning of trees to permit air movement and the application of fungicides starting with the advent of cool rainy fall weather.

Phytophthora Blight of Summer Squash

A destructive leaf and stem blight of summer squash (*Cucurbita pepo* var. *condensa*) has occurred sporadically since 1948 in several plantings in the coastal plain and Piedmont areas of North Carolina. A fungus tentatively identified as *Phytophthora capsici* Leonian has been consistently associated with this disease. *Phytophthora* spp. have been associated with fruit rots, root and stem rots, wilts and blights of cucurbits, but there does not seem to be any previous reference to a *Phytophthora* stem and leaf blight of summer squash similar to the disease observed in North Carolina.

Isolates of the fungus from blighted squash in culture were similar to isolates of *Phytophthora capsici* obtained from blighted pepper (*Capsicum*) plants and conformed morphologically to descriptions of *P. capsici*. Isolates from both sources responded identically to temperatures.

Leaves and petioles of potted squash and pepper plants were inoculated with drops of zoospore suspensions. The plants were held in a moist chamber where the temperature varied from 70° to 82° F. Irregular, grayish-green, water-soaked spots ¼ to ½ inch in diameter were evident approximately 16 hours after inoculation on both squash and pepper leaves.

Tomato, pepper and cucumber fruits similarly inoculated were held at approximately 20° to 25° C. After three days the tomato and cucumber fruits developed large water-soaked lesions, whereas the pepper fruits developed light tan rather dry lesions. Five days after inoculation, about half of the surface area was infected on all fruits. The fungus sporulated on the fruits of all three hosts, producing a tufted cottony growth of mycelium and sporangia over the lesion surface.

In another series the inoculated squash plants began wilting in five days and the inoculated pepper 14 days after inoculation. In both instances the plants were attacked in the basal stem region and were dead several days after showing the first symptoms of wilt.

Comparable results were obtained in all of the inoculation tests using isolates from squash or pepper. Sporagia were produced in lesions on both hosts following inoculation with isolates from either host. The incubation period and symptom expression for the respective hosts were the same regardless of the origin of isolates.

Pythium Stem Rot and Wilt of Pepper

During late June 1953, symptoms similar to those produced by *Phytophthora capsici* were noted in several pepper (*Capsicum annuum*) fields in eastern North Carolina. In most instances relatively little damage resulted, except at one location where approximately 30 percent of the plants were killed. Isolations from diseased plants consistently yielded a species of *Pythium*, but not *Phytophthora capsici*.

Inoculation experiments showed the *Pythium* isolates to be pathogenic. Potted pepper plants (California Wonder variety) 6 to 8 inches in height were inoculated and held in a moist chamber at 70° to 80° F. First visible symptoms appeared within two days as dark, water-soaked lesions on the main stem and petioles. The younger stem tissues towards the top of the plant were rapidly invaded and frequently the entire terminal portion of the stem was killed. The progress of the fungus down the stem was much slower.

Characteristics of the fungus agree generally with those described for *Pythium aphanidermatum* (Edson) Fitzpatrick.

There does not seem to be any previous report of a stem rot and wilt of pepper caused by a species of *Pythium*.

Damping-Off of Citrus Caused by Pythium Aphanidermatum

Late in July 1953 rough lemon seedlings at Thermal, in the Coachella Valley of California, were attacked by damping-off. The seedlings had been planted in a shaded seed bed and watered by basin irrigation. At the time of observation the soil temperature was approximately 34° C.

The fungus obtained in cultures from these seedlings was identified as *Pythium aphanidermatum*. *Pythium* spp. are among the fungi associated with damping-off of citrus seedlings, but no specific reference to *P. aphanidermatum* as a causal agent of damping-off in citrus has been found. To test pathogenicity of the fungus in citrus seedlings, six pots containing chloropicrin-fumigated soil were planted each with 40 sweet-orange seeds and another six pots with 40 rough lemon seeds, on 11 August 1953. These 12 pots were then separated into three groups of two sweet-orange and two rough lemon pots each. To each pot of the first group, in which inoculation was to be made at the time of seedling emergence, was added 3/4 inch of autoclaved sand. To each of the second group, which served as controls, 40 sterilized hemp seeds were added and covered with autoclaved sand. To each of the third group was added 40 hemp seeds which had been inoculated in a water culture three days previously with *Pythium aphanidermatum* isolated from damped-off rough lemon seedlings, and then autoclaved sand.

Each of these 12 pots was then placed in a 5-gallon can and flooded for two hours with tap water. After flooding, they were allowed to drain and were placed in a cabinet in which the air temperature was 34.5° C. and the soil temperature 26° C. The following day flooding and draining were repeated. After six days, and on 24 and 25 August and 2 and 3 September, the pots were again flooded and drained two days in succession. Except during periods of flooding, the soil temperature was maintained between 31° and 35° C. The air temperature in the cabinet was held between 37° and 45° C.

On 23 August, soon after the first seedling emergence, each pot in the first group was inoculated by pressing into the sand cover 40 sterilized hemp seeds, upon which *Pythium aphanidermatum* had grown three days, in order to permit infection at about the time of emergence. Infection was noted on rough lemon seedlings in this group only 27 hours after inoculation. Fifty-three hours after inoculation eight of the 11 rough lemon seedlings that emerged had damped-off. Oospores were found in one of these when it was examined a few hours later. *Pythium aphanidermatum* was readily recovered from several seedlings.

Percentages of seedlings emerging and surviving in the various series are as follows: inoculated at planting (group 3), sweet orange 10, rough lemon 4; inoculated at emergence (group 1), sweet orange 1, rough lemon 4; controls (group 2), sweet orange 58, rough lemon 53.

The experimental results mentioned above show that *Pythium aphanidermatum* is capable of inducing damping-off of sweet orange and rough lemon seedlings under conditions of temperature and soil moisture similar to those prevailing during the summer in citrus seed beds in the Coachella Valley. The development of extremely high percentages of pre-emergence rot following inoculation suggests that this fungus is important also in pre-emergence rot in citrus seed beds under high temperature conditions.

Plant Quarantine Announcements

Federal Republic of Germany

A Ministerial Decree of 22 May 1954, published in the *Bundesanzeiger* No. 106, 4 June 1954, authorizes the importation, until further notice, of leaves and twigs of laurel (*Laurus nobilis*) and of cherry-laurel (*Prunus laurocerasus*) for decorative purposes from France, Italy, Switzerland and Spain throughout the year. Each shipment must be accompanied by an original copy of the phytosanitary certificate, issued by the plant protection service of the country of origin, and certifying that the consignment has been inspected and found to be free from dangerous plant diseases and pests, especially San José scale (*Aspidiotus perniciosus*), and that it has been fumigated. The goods must be imported through either Basel or Munich, where the customs offices are authorized to deal with plants and plant products intended for decorative purposes.

The effect of this new Decree is, thus, to provide for exemption from the general prohibition of entry into Germany of parts of broadleaf trees for decorative purposes laid down in the Ordinance of 3 November 1931 concerning San José scale and apple fruit fly.

Finland

Ministerial Decrees No. 264 and No. 265 of 3 June 1954, published in the *Finlands Författningssamling*, 10 June 1954, amend respectively Decree No. 395 of 1947 concerning conditions governing the importation and transit of living plants and parts of plants from Belgium and Holland and Decree No. 396 of 1947 concerning conditions governing the importation and transit of plants and parts of plants. In both cases, the port of Pori is authorized for the entry of living plants and parts thereof, in addition to the ports of Helsinki and Turku previously authorized.

French Cameroons

Order No. 3140 of 16 June 1954, published in the *Journal Officiel* Vol. 39, No. 1011, 14 July 1954, establishes the organization and functions of the Plant Protection Service which was created by Order No. 5175 of 16 October 1953. The Order contains the following provisions concerning plant quarantine.

The Plant Protection Service consists of two units, one on pest control and the other on plant quarantine. Quarantine control of plant materials offered for importation and exportation is to be carried out in accordance with the provisions of the Law No. 52–1256 of 26 November 1952 relative to plant protection in French overseas territories (see *FAO Plant Prot. Bull.* 1 : 77. 1953.)

The importation of all plants and parts of plants (including seeds, tubers, cuttings, etc.) for propagation purposes, soil, compost and their packing is prohibited, except when accompanied by a phytosanitary certificate issued by a qualified authority of the country of origin, declaring the materials free from all parasites. Packings of plant origin, such as date palm and banana, which may carry dangerous parasites, are subject to the same requirement. A certificate form, which is essentially identical with the model provided in the International Plant Protection Convention of 1951, is annexed to the Order. The above restriction, however, does not apply to plant products for consumption, except wherever the High Commissioner decides otherwise.

A phytosanitary inspector will be appointed at each of the plant protection control posts in the following localities:

> For importation: Douala, Kribi, Dschang, Yaoundé, Ebolowa, Bertoua, Ngaoundéré, Garoua, Kaélé, Maroua, Mora, Nkongsamba.
> For exportation: Douala, Kribi, Yaoundé, Ebolowa, Garoua.

Three quarantine stations will be organized: one in the Wouri region for the port and the aerodrome of Douala; the second in the Nkolbisson agronomy center; the third at the Garoua plant protection station.

Italy

A Ministerial Decree of 1 July 1954, relating to the control of importation into and transit through Italian territory of plants and plant products, and published in the *Gazzetta Ufficiale della Repubblica Italiana* No. 181, 10 August 1954, revokes the Ministerial Decree of 24 March 1948 on the same subject. The provisions of the new Decree are, in essence, as follows:

Ports of entry. Living plants, parts thereof, including seeds and other propagating materials, fresh fruit, garden produce and any green stuff may be imported only through the following customs offices: Ventimiglia, Genoa, Turin, Milan, Bolzano, Udine, Venice, Verona, Leghorn, Rome, Naples, Bari, Brindisi, Taranto, Reggio Calabria

Messina, Palermo, Catania, Syracuse, Cagliari, and Olbia. Samples of plants, parts thereof and seed may also be imported through Florence.

The above-mentioned materials, if presented at other customs offices, will be rejected or reforwarded at the expense of the party concerned. If the railway station of destination of such goods is not situated at an authorized point of entry, any frontier customs office may retain the goods for phytosanitary inspection to be carried out, at the expense of the party concerned.

Importation and transit prohibited. The following plant materials are prohibited entry into Italy:

1. Fruit-bearing plants or trees, parts thereof, and any fresh fruit from Argentina, Australia, Brazil, Canada, Chile, China, Hawaii, India, Japan, Mexico, Pakistan, the Philippines, South Africa, U. S. A., and Uruguay, on account of foreign fruit flies (*Anastrepha* and *Dacus*), *Rhagoletis pomonella, Plowrightia morbosa,* and *Gloeosporium perennans.* Fresh fruits from Argentina, South Africa and Chile may be exempted from this prohibition (see following section, para. 6).
2. Citrus fruit trees, parts thereof, fruit and fruit peel from all countries, on account of *Prontaspis* (*Unaspis*) *citri,* white fly (*Aleurodes*), *Pseudomonas* (*Xanthomonas*) *citri, Corticium salmonicolor, Gloeosporium limetticolum, Diplodia citri,* and tristezza disease. Citrus fruit in transit may be exempted from this prohibition (see following section, para. 7).
3. Solanaceae: plants, parts thereof and fruit of all species, except potato tubers, from all countries, on account of *Heterodera rostochiensis, Epitrix* spp. and virus diseases.
4. Maize stems and ears from Africa, on account of *Busseola fusca* and other species and virus diseases.
5. Almonds in shell from all countries except Spain, on account of *Eurytoma amygdali* and *Ascochyta chlorospora* (*Gnomonia circumscissa*).
6. Cactaceae: plants, parts thereof and fruits from all countries, on account of dangerous insects and diseases harmful to the Indian fig.
7. Living trees, parts thereof and seeds of oak (*Quercus* spp.) and of Chinese chestnut (*Castanea mollissima*), and oak timber from the U. S. A., on account of oak wilt (*Chalara quercina*). Timber which has been previously treated by the vacuum and pressure process and is accompanied by a certificate to this effect issued by the competent authorities in U. S. A. will be exempted from this prohibition.
8. Beet plant and parts thereof (excluding glomerules) of all species from all countries, on account of virus diseases.
9. Coniferous trees and parts thereof, of the genus *Pseudotsuga* from all countries and of the genera *Abies, Picea, Pinus,* and *Tsuga* from all non-European countries.

Importation or transit restricted. The following plant materials may not be imported into or transported through Italy, unless the specified conditions have been met.

1. Potato tubers. Importation and transit are permitted on condition that the goods are free from earth, black wart (*Synchytrium endobioticum*) and ring rot (*Corynebacterium sepedonicum*) and that each consignment is accompanied by an official phytosanitary certificate issued by the exporting country and attesting freedom from dangerous pests and diseases.
2. Beet glomerules. Importation and transit are permitted, if accompanied by a phytosanitary certificate attesting that the glomerules are free from viruses and originate from healthy plants grown in fields at least one kilometer away from locations where virus diseases are present.
3. Coniferous trees and parts thereof of the genera *Abies, Picea, Pinus* and *Tsugo* from European countries. Importation and transit are permitted if accompanied by a phytosanitary certificate issued by the country of origin, in Italian or French, attesting that the shipment is free from pests and diseases, especially *Rhabdocline pseudotsuga,* and indicating origin and all requisite data for identification.
4. Bean plants and parts thereof. Importation and transit are permitted, if accompanied by an official phytosanitary certificate attesting freedom from dangerous pests and diseases particularly bacterial wilt (*Corynebacterium flaccumfaciens*).
5. Fresh fruits from Argentina. Importation and transit are permitted only through the port of Genoa and are limited to the following fruits during the periods specified:
   Pears and apples: 1 February – 30 June;
   Quinces, peaches and plums : 1 January – 31 May;
   Grapes free from stems and leaves 1 January – 30 June.
6. Fresh fruit in transit from South Africa and Chile. Transit is permitted through the ports of Genoa, Naples and Venice, throughout the year.
7. Citrus fruit in transit. Transit is permitted only through Genoa, Naples and Venice. Fruits must be individually wrapped, properly packed in strong cases, and sealed. Each consignment must be accompanied by an official phytosanitary certificate attesting freedom from dangerous pests, indicating

its origin and containing all data necessary for precise identification. Fruits from Spain, Israel, Lebanon, Cyprus, Egypt and Turkey may be transported throughout the year and those from other countries only from 1 December to 31 March.

8. Almonds in shell from Spain. Importation and transit are permitted through all the authorized customs offices, if each consignment is accompanied by an official phytosanitary certificate attesting freedom from dangerous pests, indicating the origin and containing data for identification. In the case of consignments in bulk, forwarded by land, the railway wagons must be sealed and numbered by the Spanish plant protection service. Where consignments are shipped by sea, the products must be in strong packings, sealed, numbered and properly labelled.
9. Seeds of fodder plants. These may be imported if the absence of seeds of *Cuscuta* and other harmful plants has been verified by inspection on arrival. In the case of transit, entry may be permitted after *Cuscuta* has been removed in accordance with Law No. 987 of 18 June 1931.

Importation for scientific purposes. The above prohibitions or restrictions do not apply to plant materials imported for study or experimentation with the authorization of the Ministry of Agriculture and Forestry.

Importation by travellers. The above prohibitions or restrictions shall be applicable to plants and parts of plants, including seeds, brought in by travellers from abroad.

Plant materials not for propagation. Plant products for consumption or industrial uses, except those specifically prohibited or restricted, may be imported through any customs office, provided that the provisions of Article 9 of Law No. 987 of 1931 are observed.

News and Notes

Netherlands Ratifies the International Plant Protection Convention

The Netherlands Government, whose representative signed the International Plant Protection Convention on 6 December 1951, deposited the instrument of ratification with the Director-General of FAO on 29 October 1954. The instrument declares that the Convention shall apply to the Kingdom in Europe, and to Surinam and Netherlands New Guinea.

The number of countries contracting to the Convention, including both signatory and adhering members, is thus, at the time of writing, twenty-one, namely: Australia, Austria, Belgium, Cambodia, Canada, Ceylon, Chile, Denmark, Dominican Republic, Egypt, El Salvador, India, Iraq, Japan, Korea, New Zealand, Netherlands, Philippine Republic, Spain, Sweden and the United Kingdom.

International Symposium on Plant Nematodes

Under the auspices of FAO, an International Nematology Training Course and Symposium was held at Rothamsted Experimental Station, Harpenden, England, 3–14 September 1951. The usefulness of such a symposium in promoting the science of nematology was generally felt and suggestions were made that similar conferences be arranged at frequent intervals to facilitate the exchange of knowledge. Subsequently a meeting of plant nematologists was convened by Danish investigators at Lyngby in 1953.

The Dutch nematologists are now convening an international symposium on plant nematodes and the diseases they cause, which will take place at Wageningen, 30 June to 5 July 1955. The first day will be devoted to nematological techniques, the second day to *Heterodera* problems and the third and fourth days to problems relating to the stem and bulb nematodes, *Pratylenchus* and other species. The last day will be reserved for field excursions.

All research workers actively engaged in nematological investigations are invited to attend this symposium. The responsibilities of its organization are shared by the Netherlands Plant Protection Service, the Institute for Phytopathological Research and the Laboratory of Phytopathology of the Agricultural University, which are all located at Wageningen and to which inquiries should be directed.

EPPO Working Party on Seed-borne Diseases

A Working Party on Seed-borne Diseases, convened by the European Plant Protection Organisation (EPPO) in collaboration with the International Seed Testing Association (ISTA), was held at Paris, 2–3 July 1954. Its participants included several members of the ISTA Committee on Seed-borne Diseases and Pests, and a representative of FAO.

In view of the lack of standard methods for testing many diseases carried by seeds, the Working Party recommended that ISTA embark on a policy of building up, disease by disease, internationally acceptable instructions on testing methods. For the purpose of providing a guidance to the European plant protection services, a preliminary list of injurious seed-borne diseases of importance to Europe was drawn up by the Working Party. The list is divided into three groups and includes 14 diseases as follows.

Group A. – Organisms in respect of which an importing country would be justified in demanding a certificate that the seed crop had been inspected in the field or had been grown in a territory where the disease was unknown;

- Barley stripe mosaic
- Lettuce mosaic
- Bacterial wilt of beans (*Corynebacterium flaccumfaciens*
- Bacterial canker of tomato (*Corynebacterium michiganense*)
- Common bean blight (*Xanthomonas phaseoli*)
- Bacterial blight of pea (*Pseudomonas pisi*)
- Bacterial spot of tomato and pepper (*Xanthomonas vesicatoria*)

Group B. – Organisms for which one or more testing methods are already available but lack international recognition;

- Blind seed disease of ryegrass (*Ciboria temulenta*)
- Flag smut of wheat (*Urocystis tritici*)
- Plasmo disease of flax (*Mycosphaerella linorum*)

Group C. – Organisms on which further research is needed before a satisfactory testing method can be evolved;

- Dwarf bunt of wheat (*Tilletia brevifaciens*)
- Black patch of clover (*Mycelia sterilia*)

Leaf blight of oats (*Helminthosporium victoriae*)
Leaf disease, stunt and wilt of cyclamen (*Ramularia cyclaminicola*)

The problem of certifying seeds to meet the phytosanitary regulations of importing countries was discussed. In view of the fact that reliable methods for detecting a number of seed-borne diseases are still unavailable, the Working Party felt that a general phytosanitary certificate issued by the exporting country covering all seed-borne diseases has, unavoidably, profound limitations. It was, therefore, suggested that the importing countries, in requesting phytosanitary certificates for imported seeds, specify the particular seed-borne diseases which they consider injurious and against which they would desire to be protected.

The report of the Working Party is obtainable from EPPO.

Cacao Quarantine Recommended by the Inter-American Committee on Cacao

The Fifth Meeting of the Inter–American Technical Committee on Cacao, organized by the Inter–American Institute of Agricultural Sciences in co–operation with the Costa Rican Ministry of Agriculture and Industry, was held at Turrialba, 4–10 July 1954. Seventy–seven delegates, representing 16 countries and 34 institutions, were present. Among the recommendations made by the Committee, one concerning cacao quarantine is of special interest.

In view of the increasing movement of cacao planting material, the Committee recommends that a quarantine service be established in tropical America, aiming at the prevention of further spread of *Marasmius perniciosus*, *Monilia roreri* and cacao viruses, and of the introduction of Capsids. Mexico, Central America (except Nicaragua), Bahia, Brazil and the West Indies (except Trinidad, Tobago and Grenada) are listed as free from these three diseases. The following countries are known to be infested with one or more diseases: Colombia, Ecuador, Peru, Venezuela (*M. perniciosus* and *M. roreri*); Trinidad (*M. perniciosus* and virus); Guianas, Grenada, Tobago, and Amazona (*M. perniciosus*); Nicaragua (unidentified disease). The quarantine measures recommended are as follows:

Movement within tropical America. When both the exporting and importing countries are disease–free, the material should be inspected, treated by a fungicide and an insecticide, and grown under observation in a closed greenhouse for at least 3 months and then at isolated nurseries until at least two flushes have matured. The materials destined for Central America should pass through the Inter–American Institute of Agricultural Sciences at Turrialba, where the inspection, treatment and quarantine will be carried out.

Materials moving from an infested country to a disease–free country should go through the intermediate quarantine station in Puerto Rico where the materials will be inspected, fumigated and grown under observation in a closed greenhouse and then at isolated nurseries. Materials destined for Central America should be received first at Turrialba, where the inspection, treatment and quarantine at isolated nurseries will be carried out. For materials destined for South America and the West Indies, the same procedures will be undertaken by the importing countries.

Importation from outside tropical America. No material should be imported from West Africa because of the danger of introducing the swollen shoot virus complex and Capsids. Material from Ceylon should go through an intermediate quarantine station, because of the presence of mild virus strains. Material from South East Asia (except Ceylon) and South West Pacific areas may be imported directly to tropical America.

The Committee also recommends that information on the distribution of cacao diseases and pests be gathered by cacao technicians throughout the world and be forwarded to Dr. Desrosiers, of the Estación Agrícola Tropical del Ecuador, Guayaquil, for use in the preparation of distribution maps.

French Union Congress on Plant Protection

A Congress on the protection of plants and plant products in the tropics was held at Marseilles, 22 to 24 September 1954, under the auspices of the French Overseas Institute and the Chamber of Commerce of Marseilles. In its resolutions the Congress called attention to the following items of general interest.

1. That the study of grain-eating birds in central Africa should be intensified.
2. That consideration should be given to the damage to agriculture caused by certain protected animals.
3. That a central organization should be established for the study of natural enemies of tropical forests.
4. That no method of chemical control should be introduced until it has been proved harmless to the local flora and fauna.
5. That manufacturers and merchants should ensure that their plant protection products retain their essential properties during storage in hot climates.

6. That all territories should undertake plant protection measures and establish legislation to safeguard their agricultural wealth and meet their obligations under the various regional and international plant protection conventions.
7. That research on entomological and plant pathological problems affecting tropical crops should be intensified.

A full report on the Congress has appeared in the October 1954 issue of " Etudes d'Outre-Mer " published by the Institute.

Pesticide Tolerance Schedule in the United States

The United States Department of Health, Education and Welfare issued on 20 October 1954 regulations establishing tolerances for permissible pesticide residues on fresh fruits and vegetables. The tolerance schedule included in the regulations is tentative and subject to review and change.

The schedule provides that no residues of the following pesticides shall be allowed to remain on fruits or vegetables:

Calcium cyanide
Dinitro–O–sec. butylphenol
Dinitro–O–cresol
Hexaethyl tetraphosphate (HETP)
Tetraethyl pyrophosphate (TEPP)
Hydrocyanic acid
Mercury–containing compounds
Nicotine and nicotine–containing materials
Selenium and selenium–containing compounds

For other commonly–used pesticides the tolerance in p.p.m. on specific fruits and vegetables is as follows:

Aldrin	0.1	
Benzene hexachloride	5.0	
Calcium arsenate	3.5	of combined As_2O_3
Copper arsenate	3.5	of combined As_2O_3
DDT	7.0	
Chlordane or heptachlor	0.1	
2,4 Dichlorophenoxy acetic acid	5.0	
Dicyclohexylamine salt of dinitro–O–hexylphenol	1.0	
Dieldrin	0.1	
EPN	3.0	
Forbam	7.0	
Fluorine compounds	7.0	of combined fluorine
2–Heptadecyl glyoxalidine	5.0	
Lead arsenate	7.0	of combined lead
Lead arsenate (on citrus fruits)	1.0	of combined lead
Magnesium arsenate	3.5	of combined As_2O_3
Methoxychlor	14.0	
Naphthalene acetic acid	1.0	
Parathion	1.0	
Phenothiazine	7.0	
Sodium arsenate	3.5	of combined As_2O_3

Roma - Tip. del Senato del dott. Giovanni Bardi